Rural Radio Resource Pack

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AGROBIOTECHNOLOGY AND FOOD SECURITY

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Technical Information

Unlike medical biotechnology – where there is very little controversy about the benefits it can bring to human health – agricultural biotechnology raises high emotions and considerable fear. One reason is that much of the reporting, especially that coming out of Europe, has been biased, poorly informed and, frankly, scary. Stories about 'Frankenstein' foods made from genetically modified organisms that will destroy wildlife and create monster, uncontrollable weeds is typical of the worst type of reporting. On the other hand, those supporters of genetic engineering who claim that GM crops can solve problems of food security are being equally unrealistic. This pack offers a range of views on the subject and will provide, we hope, a good basis for discussion and phone-in programmes as well as interviews with those who can bring a local perspective to the subject.

Biotechnology – what does it actually mean?

Although most people nowadays associate biotechnology with genetic engineering (see glossary at the end of this section) it is actually a much older science. Some people argue that even cheese-making and beer-brewing count as biotechnology, and these must surely be among the oldest food processing technologies known to man. More recent innovations in biotechnology include raising disease-free planting material, for crops such as sweet potatoes or cassava, in a laboratory by tissue culture and micropropagation. These aspects of biotechnology are covered in the interviews: ***Disease-free seeds from biotech***, ***GM food aid – yes or no?*** and ***Can small scale farmers benefit from biotechnology?*** Another phrase you will hear is 'marker assisted' technology. This is used to help a conventional plant breeder tell much more quickly if a desired characteristic, such as disease resistance, has been successfully transferred. There is very little controversy about the value to farmers of this so-called 'second generation' biotechnology. It means they can grow healthier, more profitable crops and so contribute to greater food security.

Where the controversy lies is in the 'third generation' biotechnologies – those that depend on some form of genetic engineering. Of course each country must choose for itself what it wants out of modern agricultural biotechnology. (see ***Each nation has a right to decide*** and ***A regional stance on GMOs***. But it is a decision that is becoming more pressing as the opportunities to make use of GMOs increase. Hand in hand go concerns about safety. A thorough understanding of the possible implications on the environment and biodiversity protection, as well as on agricultural development, trade, economic prosperity and public attitude is essential. And no country should be pressured into establishing piecemeal biosafety procedures simply because an application to import GMOs has been made by powerful interests.

The interview ***GM food aid and food security*** provides an easy to understand explanation of gene transfer and raises some of the concerns that people have. These fall into several different categories as follows:

Will people who eat GM food be harmed in some way?
There is – so far – no evidence that people who eat GM food will be harmed. Indeed, would it not be very difficult to prove one way or another?

Will the environment be harmed in some way?
Trials are continuing in many countries to assess whether genetically modified plants can cross with wild, closely related plant species and destroy biodiversity, or whether the herbicides that are used with many GM varieties will kill wildlife. In Britain, for example, four years of trials have just been completed. The results will not be published until later this year but this has not prevented opponents of GM crops from arguing that the results will be inconclusive. The argument is that if we cannot prove that GM crops are safe, we should not use them. This is the so-called 'precautionary principle' and is an angle explored in the interview ***Each nation has a right to decide***.

Will the introduction of GM crops harm our export trade to the EU?
While the EU maintains its ban on the import of GM crops, and also on livestock that has been fed on feed containing GM soya or maize, this will obviously be of concern especially to ACP countries that have quotas allowing them preferential access to EU markets.

Will farmers who cannot afford the new GM crop varieties find themselves unable to compete with those that can? And will farmers find that local seed varieties disappear because major commercial seed companies producing GM varieties will dominate the seed industry and squeeze out smaller companies producing local seed?
The interview ***Without biosafety legislation in place, farmers have no choice***, tackles this issue.

What effect will GM crops have on food security?
This is the principal question behind most of the interviews in this pack but perhaps of special interest is ***Without biosafety legislation in place, farmers have no choice*** and ***Concentrate on forward-thinking farmers who are not shy of technology***.

Is genetic engineering – the manipulation of DNA (the 'blueprint' for life) – ethical?
Some will argue that man has been manipulating plants and domestic animals through breeding programmes since agriculture began. Others will say that the ability to insert a gene from one organism to another across species that could never 'cross' naturally, is quite different from conventional breeding and that it is unnatural and therefore wrong.

There are doubtless many other issues that can be discussed but we hope that these ideas and questions will be a useful starting point.

Please note that:
Most of the interviews were recorded at a workshop held in Zambia last September. At the time, Zambia had decided not to allow the import of GM maize as food aid for fear of the consequences should farmers decide to plant it. Since then, the decision has been made to allow in GM maize but to mill it before distribution. This was the policy adopted by Zimbabwe and by Malawi. See ***GM food aid and food security*** and ***A regional stance on GMOs?***

Glossary

Biosafety legislation: The precautions that a country establishes to check the safety of any new introduced plant species, including GMOs.

Bt (as in 'Bt cotton'): A crop variety that has been genetically modified to carry a gene from the soil bacteria, *Bacillus thuringiensis*, that is toxic to insect pests.

Cartagena Protocol: the international agreement that covers biosafety.

DNA: The genetic material that defines an organism's characteristics

Gene: a stretch of DNA, that has a defined function and can be inherited

Genetic engineering: The manipulation of genetic material. It includes isolating, copying and multiplying genes, recombining genes or DNA from different species, and transferring genes from one species to another.

Gene transfer: Transferring genes from one organism to another.

Genetic marker: Any segment of DNA that can be used as a reference point to map or locate other genes.

Genome: The total genetic material of a cell or organism

Genomics: The study of the function of genes

GMO: Genetically modified organisms. A plant whose characteristics have been changed through genetic engineering. This may be to make it resistant to pest attack, to make it drought or salt tolerant, more nutritional, or – most commonly – resistant to a specific herbicide. This allows farmers to spray their fields with a herbicide thereby killing all plants except the GMO crop.

Precautionary principle: that a new technology must be proved safe before it is allowed.

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GM food aid – yes or no?

Cue: The Zambian government has refused to accept food aid that contains genetically modified maize – despite the fact that many people are suffering food shortages as a result of drought in parts of the country. Are they right to do so? Can biotechnology bring benefits to farmers and help to create food security for the nation? Bernadette Lubozhya is an agricultural scientist in Zambia and, as she explains to Daniel Sikazwe, it depends what you mean by biotechnology.

IN: "Generally, when you just talk about biotechnology . . .
OUT: "… even questionable food and feed them."
DUR'N 5'07"

BACK ANNOUNCEMENT:
Bernadette Lubozhya, talking to Daniel Sikazwe.

Transcript

Lubozhya Generally, when you just talk about biotechnology, it has got a role to play in providing us with food. But, mind you, not all the biotechnologies are beneficial to the country. Specifically like GMO, or genetic engineering in crops, is not beneficial for the country. But technologies like tissue culture, in vitro, artificial insemination, detection technology, genomics, mutations. Those type of technologies are indeed important to help us come up with better varieties which could be pest resistant and perhaps better yielding than what we have. And also even have a role to play in the animal breeding. But when you talk about biotechnology as an answer itself to food security, I say no.

Sikazwe *Why do you say 'no'*?

Lubozhya Food security is more than just food production. People can produce a lot of food in a country yet people can go hungry. Food security involves that everybody must have access to enough food at all times in the right quantity and quality. That is food security.

Sikazwe *Getting back to the issue of genetic modification. The argument in the scientific world and I think even among some consumers nowis that with genetic modification we will be able to produce more and to feed the starving millions – take for instance the situation in southern Africa. What do you have to say?*

Lubozhya It is not true that genetic modification will feed the world. GM maize, GM soyabeans have been found that actually they don't yield much higher than conventional ones. GM maize at best it just yields 10% higher than the conventional varieties. When it comes to soyabean, which are modified. In actual fact trials in the United States are carried out independently by various universities in the United States have actually proven that the GM soyabean are yielding less than the conventional soyabeans.

Sikazwe *But there are a lot of other African countries - given the situation of South Africa - where genetically modified foods are being grown. Probably they have discovered that genetic modification is a solution to food insecurity.*

Lubozhya You get an impression there is a lot of food production done through using genetic modified varieties in South Africa. Maize, which is currently produced in South Africa is for animal feed. Maize which is produced mostly in America which is genetically modified is for animal feed. It is not for human consumption. But of course you know one thing about this genetic modification, it is really more of a business. That's why you hear there's a lot of dramatizing in how good it is because I will tell you that in the United States, there are other modern technologies which have been used to produce better varieties than genetic modified ones.

Sikazwe *Let me bring you back to Zambia. The government has rejected genetically modified food that has been donated by donors and yet there are millions of people starving because of the famine, because of the drought. And you said there is a lot of dramatization on the issue of genetically modified food. Wouldn't you call that dramatization?*

Lubozhya No. I think our country, at the moment, is fortunate that it is into the hands of responsible government. Particularly our Minister of Agriculture. He earns a lot of respect from me. He is a person who has listened to his scientists. He has also read from other sources like FAO and other areas and he has come to the conclusion, together with the Minister of Science and Technology, who are the custodians of biotechnology that GM maize would be detrimental to our small scale farmers' farming community. You know the farming system would be disturbed. And also, there are health issues which need to be addressed. And we realize that Zambia does not have that capacity to do that. We are waiting for the results coming from elsewhere. For example, in Europe. You know that Europe is only doing trials, until they have concluded their research – which is coming to a conclusion in the year 2004. So I see the Zambian government being responsible. Just because your people are starving you take even questionable food and feed them? *End of track*

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Without biosafety legislation in place, farmers have no choice

Cue: With conflicting and sometimes very heated views about the value of GM crops, to whom can farmers turn for reliable information? Many will be asking their professional institutions such as, in Zambia, the Zambia National Farmers' Union – the ZNFU. Chris Kakunta asks ZNFU member, Lovemore Simwanda, what farmers in Zambia think about the issue.

IN: "The view of the farming community …"
OUT: "….to pass on to our farmers."
DUR'N 5'26"

BACK ANNOUNCEMENT:
Lovemore Simwanda of the Zambia National Farmers Union was talking to Chris Kakunta.

Transcript

Simwanda The view of the farming community, both commercial and small scale is very mixed at the moment because the information regarding the safety or good use of GMOs is very mixed from our scientists at the moment. Especially given the fact that there is no work that is being done here in Zambia at the moment. It makes the whole situation very difficult for the farmer to take either way.

Kakunta *Why do you think there is such a mix up?*

Simwanda You see Zambia is a country that, it is well known, doesn't seem to want to do things systematically. You know the issues on GMO started 4 or 5 years ago and if people had put in place proper policy guidelines and everything. And if there was need to have trials and everything else, if they had been systematic and people had been provided with information that is born in country. But the fact that now all the information we are discussing or using is from literature and experiences from outside the country – nearest from here is S. Africa – otherwise elsewhere it is United States, Europe at research level, China, Mexico in S. America, to mention a few. However, just to bring you back to the position of ZNFU members, we have a group that is pro GMO. We have a group as well that is anti GMO. The anti GMO group basically has its reasons that all our export market is Europe and Europe has told these people categorically that if Zambia goes GMO, they stop buying anything from Zambia because of the fear of contamination and things like that. And that's the market that we already have. Of course the other grouping also, the pro GMOs, they also say these issues of hunger could easily be tackled with GMO technology. And without concrete information coming out from scientists and without government putting in place appropriate regulations and biosafety guidelines and regulations in place, this will be a difficult scenario to handle. And the fact that without the two legal guiding principles, it does not give any farmer any choice on what to do.

Kakunta *From the statistics, your membership is about 75% small scale farmers and the remaining commercial farmers. And when you look at issue of exporting crops, the majority of those who export crops will be commercial farmers?*

Simwanda Indeed most of the commercial farmers grow for export. But again, with the smallscale farmers there are also worries about the genetic seed erosion because of the introduction of GMO and people will lose their traditional old seed that they relied upon. And the other thing, most of the GMO corn has been said to have been developed with insect resistance. But the major problems that a small scale farmer faces here is the issue of drought and flooding. So those are our problems. And when they lose their traditional genetic resource in terms of seed and there are fears they will be dependent on these five multinationals for their inputs, if they go GMO. And then given that the economic base is very low, I don't think they will survive in the agricultural sector which is their main livelihood. So there are all these sorts of fears that need very specific and pragmatic research that can bring out results that can convince people and say this has been done in Zambia and this can work for you.

K*akunta* *So what would you say in terms of the future of agrobiotechnology in Zambia?*

Simwanda Future of agrobiotechnology in Zambia? As far as we see the things, one cannot run away from it. It is coming and people should be ready for it but we would like government to move faster because they are about 5 years behind. Make sure they put all the policy guidelines, the regulations, the biosafety regulations and all the legislation that is required to manage this biotechnology.

Kakunta *That is the role of government. What about ZNFU – what role do you think you can play to make sure Zambia is ready for GMO?*

Simwanda First our task is to push government for biosafety policy, regulations and legislation in place. That's one area. At the same time, we are trying to create awareness for the people to understand it a little bit more. And we are not just talking to one institutions we are talking to both anti and pro in US, we have been talking to institutions in Europe. We have been talking to four or five countries now and we have just got a lead to some Japanese and Chinese contacts that we will be getting in touch with and also India and South Africa who are producing contradicting results as far as Bt cotton is concerned. South Africa, Makatini flats, is doing very well and I have been told that the people have become economically empowered and things like that. The same kind of Bt cotton has been tried in India under more or less similar conditions and it is no better than ordinary cotton and this is the kind of mixed information we get. And for us to find which way to go is a hard road but we are going to see if we can get as much information as possible to pass on to our farmers. *End of track*

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Each nation has the right to decide

Cue: Doreen Mnyulwa is the head of Biotechnology Trust in Zimbabwe. She has been closely involved in the debate on genetic engineering and, as she tells Eldson Chagara, firmly believes it is up to every country to decide the issues for itself.

IN: "Really this is something …"
OUT: "….according to our own assessments."
DUR'N 3'08"

BACK ANNOUNCEMENT:
Doreen Mnyulwa was talking to Eldson Chagara.

Transcript

Mnyulwa Really this is something that has to be decided at national level. It is a sovereign issue and therefore each national has the right to make a choice, just as each individual has a right to safe food and at the same time has a right to food. Therefore I find that the decisions that the various nations are making to be their national right. But the issue is technology, because of its controversy, has had a discussion at international level which led to an international instrument which is called the Cartagena Protocol or safety protocol. That protocol is promoting for the precautionary approach in the use of the technology. The precautionary approach because there are still certain investigations that have to be done as far as the introduction of this technology are concerned. I am sure if each of the countries in the region had policies in place, they would find it much easier to handle the genetically modified organisms we are given today. That is why we find some countries have accepted because they have systems in place to monitor the use of these products and to ensure that they don't get into the environment without them having been assessed for the impact.

Chagara *But we understand people in the western world have taken the GMOs for some time now. Why are we so afraid of taking the GMOs here in southern Africa region?*

Mnyulwa Because the precautionary approach indicates already that certain research still has to be done to ensure the safe use of these technologies in each of our countries. Now the developed countries of course have used this technology. They have evaluated it to the satisfaction of their consumers, to the satisfaction of their constituency. They know, if anything happens, they can go back to the results of their impact studies that they have done. We on the other hand have not done those studies. We have not studied the potential impact of these organisms on these products under our own environment under tropical conditions, under Zambian conditions. This does not only involve the environmental conditions. it includes the socio-economic conditions. It includes the practices, the farming systems. An example is a farmer in the States can be cultivating 50 ha of maize. On the other hand, a

smallholder farmer would be cultivating 3ha. The neighbouring farmer might not be growing GM while the other farmer may be because he knows how to handle them. What does that do to impinge on the rights of the other farmer who may be does not want to grow the GM crops? So in other words we just have to assess at national level our needs, our capacity and adopt this technology according to our own assessments. *End of track*

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GM food aid and food security

Cue: Malawi, faced with a crisis situation, accepted genetically modified food aid, despite misgivings from some scientists. Dr Sosten Chiota is an environmental scientist at the University of Malawi. Eldson Chagara asks him to explain why some countries in the region accept, and others reject, GM food. But first what exactly is a genetically modified organism?

IN: "The controversy is among scientists…"
OUT: "….upon the people not to plant it."
DUR'N 3'05"

BACK ANNOUNCEMENT:
Sosten Chiota was talking to Eldson Chagara.

Transcript

Chiota The controversy is among scientists and non scientists alike. Within the scientific community people say this technology, although it might produce some desirable element and perhaps solve some of our problems quite quickly, so it is a good thing. But another group of scientists say well the effects of this technology, the effects are not fully known and therefore they feel that they might be maybe long term health problems that might arise from people consuming these genetically modified food. But much more seriously they worry about what it might do to other organisms in the environment. So they might end up introducing these characteristics and distort the way our environment should be. So that's why there is that controversy. So this controversy, having started among the scientists themselves, has then gone into the wider community where people are saying if you can't guarantee our safety or at least if you cannot say with certainty it is 100% free, then perhaps we should take a precautionary principle and just stay clear of it.

Chagara *There are also some other misconceptions. We see that there are countries in the southern Africa region those which have been hit by this drought, others have accepted the GM maize and others haven't. For example Malawi has accepted to get this GM maize. As an environmental scientist yourself, what can be your comment on Malawi's acceptance on GM maize?*

Chiota Well I think that is a tricky situation because the GM maize came when there was shortage of food and people were starving and so every time when you are faced with a challenge you have to weigh immediate benefits and long term benefits. The other countries like Zambia for example. They had formed a multi-stakeholder committee and that stakeholder committee advised government that they should hold on until as much information has been collected on the safety of this GM maize. So you can see that there is that problem of countries within the same region go for different policies. I think the most important thing is to minimize any undesirable effects that might arise out of accepting this maize. For example to ensure that the recipients eat it and not use it for planting because we are not sure what characteristics

might escape into the environment. And that is why some people were suggesting that if we accept GM maize it must be ground into flour before given to people just to take a precautionary measure to avoid people trying to plant it out. So my advice would be since the maize is already there, let's impress upon the people not to plant it. *End of track*

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Can small scale farmers benefit from biotechnology?

Cue: With so much controversy over GMOs – the so called 'third generation biotechnologies', it's sometimes forgotten that biotechnology has been around for a long time. But is it only for big commercial farmers or can smallscale farmers, who have little spare cash for investing in their farming business, also benefit? That's the principal interest of the Biotechnology Trust. It's Executive Director for Africa, Joseph Wekundah, talks to Sarah Reynolds about their work.

IN: "I think I'll say we are doing two things …"
OUT: "… increase food in the country."
DUR'N 6'15"

BACK ANNOUNCEMENT:
Joseph Wekundah, of Biotechnology Trust, Africa.

Transcript

Wekundah I think I'll say we are doing two things. First is to promote and second is really to make sure that whatever applications we are promoting it goes towards helping the small-scale farmers in the country.

Reynolds *Because people tend to think of biotechnology as something for big business only?*

Wekundah I think that means you are looking at GMO's which actually is a very small part of biotechnology. But we are looking at the broader aspect of biotechnology starting from the first generation all the way to second generation and also now considering the third generation in areas where we think there are constraints that can only be addressed by genetically modified products.

Reynolds *So genetically modified is third generation. What's second generation, I don't understand what the different generations mean?*

Wekundah The second generation is basically looking at things like tissue culture, microbiology, looking at biopesticides and looking at the bio fertilisers and whatever. And also looking at the marker assisted selection. But the third generation is where we actually go into the actual genetic modification. Like you get a gene from somewhere and you insert it into a particular plant of interest.

Reynolds *Well let's come on to that in a moment. But with second generation you said tissue culture. What benefits does tissue culture have to a small-scale farmer in Kenya growing cassava or Irish potatoes for example?*

Wekundah First I think I would say the tissue culture has actually increased the yields up to 40%. In some instances it does even go beyond 60, 70%.

Reynolds *But how?*

Wekundah What it does is first it cleans up the material so that all the diseases and all other you know problems that it does have will actually be more or less like cleaned up. And tissue culture also helps in increasing the growth rate so that at least whatever you have will actually grow extremely fast and it also yields at the same time so you are able to get a product to the market at one go.

Reynolds *Now what about cost to a farmer because it's all very well having wonderful planting material but if you can't afford it, then there's not much point?*

Wekundah It is very true that the cost is high. In fact like for you to get about 80 kilogram bag of certified potato you are supposed to pay one thousand six hundred which is extremely high for the small-scale farmer. So what we are doing is that we go around it by getting some of these foundation seeds and we give to farmers in the rural areas to grow this seed and they will be able to sell to their colleagues at reduced prices.

Reynolds *Now you say that you have close connections with small-scale farmers so what do they think about it? What are they doing? Are they embracing this tissue cultured type of planting material with enthusiasm or some reluctance?*

Wekundah Actually they have got a lot of enthusiasm because some of them have got further after getting a lot of potatoes and cassava. Some have even gone into processing the excess material if of course the market is not good. I will tell you that there is one woman group that I've even come up with a technique of making soap out of sweet potato. And this is happening and they are quite excited about it and therefore they go forward to continue growing this particular you know varieties that we have given them.

Reynolds *So there obviously is a place then for this second generation as you said biotechnology. Now is there a place for third generation, the genetically modified?*

Wekundah I would say, to the way I look at it, yes. There is a place for the third generation. We are talking about things like drought which is a major, major constraint in Kenya. So one of the things that we think about could be probably to get a gene out of some of these drought tolerant trees and then we transfer into maize. This maybe something that……..

Reynolds *Could that be possible?*

Wekundah I think so because you know you had the DNA for all plants and for all animals are the same. So you are able to transfer a gene from one to the other. So as long as this gene can be identified from a particular plant species it's possible to change it and get that gene and insert into our maize.

Reynolds *Are there laboratories within Kenya where scientists are actually doing this gene transfer? Actually firing the gene from one organism, one plant into another?*

Wekundah I would say yes because we have got some of these international laboratories based in Kenya and they have got all the equipment.

Reynolds *That's in international laboratories but are Kenyan scientists themselves involved?*

Wekundah I would say in ILRI we have got a few Kenyan scientists involved in this but also in KARI we now have got a lab that is being developed. In fact its started briefly working and we are trying to continue with this developing of sweet potato which actually is resistant to various viruses that attacks it. And although there is one out on trial but we think that we need to have several for our local varieties with this particular gene so that farmers can grow it without having a lot of problems.

Reynolds *So the name of your organisation Biotechnology Trust in effect means 'trust technology'?*

Wekundah Well I think in this particular case I would like to mention that our approach of promotion of biotechnology is not one-sided. We do it but we also look at the various risks involved in whatever application there is. What I would want to say here is that our focus really is set to ensure that these applications really benefit the resource poor farmer so that we are able really to address this problem of food security. Because it's only from that label that we can actually manage to increase food in the country. *End of Track 3.*

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Disease-free seeds from biotech

Cue: When we talk about agricultural biotechnology, most people assume that we mean genetic modification - breeding new characteristics into plants and animals by manipulating their genes, sometimes even transferring genes from one species to another. This kind of biotechnology has raised fears among some about the damage that may result to the environment or to human health. However, other technologies are less controversial. For example, certain tissue culture techniques are already being used in African countries to genetically clean up planting material, such as seeds. In Kenya the National Federation of Agricultural Producers is involved in a project to supply clean planting material for traditional food crops in a number of pilot districts. The Federation's Chief Executive, Mercy Karanja, explained to Eric Kadenge why she feels this kind of biotechnology is of great importance to small scale farmers.

IN: "Biotechnology is a science …"
OUT: "… suffered very many problems."
DUR'N 4'04"

BACK ANNOUNCEMENT:
Mercy Karanja of the Kenya National Federation of Agricultural Producers.

Transcript

Karanja Biotechnology is a science like any other and there is a place for science in our life so we must emphasise that biotechnology is trying to solve and give us solutions to some niche problems which we have. For example in the area of bananas, we had a lot of problems with nematodes. We couldn't get cleaning planting materials for bananas, so biotechnology has come in and given us a solution. So there is a space for biotechnology which is very critical and we have seen a lot of assistance especially to the small scale farmers through clean seed provision. That's the main thing we have seen this far

Kadenge *Other than bananas, do you have any other examples of crops that are being improved through the use of biotechnology?*

Karanja Yes, we've done a lot of work in the sweet potato vines in Kakamega, improving the nutritive value of sweet potatoes and since it's a staple food for the people in that region of this country, its very important that we are able to improve. That has happened and we are very grateful about that. There's also work on drought resistant maize and also maize that is also resistant to streak virus. I think these are some of the greatest breakthroughs we would ever be able to have in this country.

Kadenge *Have you been able to get some of the feelings from the farmers about these whole developments?*

Karanja Everything that has been done has come from the farmers. It was a study that was done. We went and found out what are the critical problems which are affecting farmers in different regions, and what was done is the key thing that the farmer requested. For example, the banana problem: the bananas were being wiped out by nematodes and now you can see livelihoods being transformed. So we have really documented very exciting cases. Exciting cases especially of bananas, citrus, cassava, and this is food for people, besides an income as food for the households. So all this work has been documented and we are very glad to see the kind of impact it has on the ground.

Kadenge *Now if I was a small-scale farmer wondering if I should at all consider using some of these products, what reasons would you give me to do so?*

Karanja I would only say where you have a real critical problem like you don't have good clean seed to plant for example like for cassava, go for what is available. It has been cleansed and the kind of biotechnology we are talking about is really the traditional biotechnology of tissue culture. It's not like developing a whole new plant all together, which is going on in other parts of the world. We are still very basically at the traditional level where it is not highly risky to develop the plants out of their own tissues. So we can't say we will not use biotechnology like has been tried to be done by some of the groups. We are saying, let us use it where we need it. We need our traditional seeds, we need biotechnology to solve these very peculiar problems we have of disease and drought, of unclean planting materials. So let's get what we can use now and allow the scientists to continue doing research, to see whether there are some other side effects.

Kadenge *Is there anything else that you would like to add?*

Karanja Yes I would really urge our scientists to continue giving us the information because that is what is the problem. If the farmers are not informed and given the whole spectrum of information, then they are bound to be vulnerable to other people coming with different gospels. But what we need to be armed with is information of where we are, where we are going and what is happening. There's a lot more biotechnology going on in this country, let it be out there for public consumption so that people can be able to dialogue concerning it very honestly and very seriously. If we can have solutions for our traditional foods, that is what we need to build in this country so that people can have their sorghums and their millets and their cassavas and their sweet potatoes on the table. Then we are able to develop the agricultural sector which has suffered very many problems. *End of Track.*

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Agrobiotechnology and food security

Concentrate on forward-thinking farmers who are not shy of technology

Cue: Lack of food security is a recurring nightmare for many African countries – their governments and their people. Most people would instinctively think that the answer lies in encouraging everyone – including the poor, subsistence farmer - to produce more food. But Stephen Muliokela, director of the Golden Valley Agricultural Research Trust in Zambia, says that's certainly not the answer – in fact it's part of the problem. Sarah Reynolds asked him to explain.

IN: "Agricultural production is basically a business …"
OUT: "…we simply need to unlock its energies."
DUR'N 5'45"

BACK ANNOUNCEMENT:
That was Stephen Muliokela of the Golden Valley Agricultural Research Trust and he was talking with Sarah Reynolds

Transcript

Muliokela Agricultural production is basically a business. To be able to produce you have to go into agricultural business and obviously once you make enough money you can buy whatever food you want.

Reynolds *Now do you then believe that, once an economy has grown sufficiently for agricultural production to be economically very good and successful, that those people who are currently really poor and suffering, with lack of food security, will benefit?*

Muliokela They will be food secure yes because some of them will become employees.

Reynolds *So you see their role as becoming labourers?*

Muliokela In some instances yes. They will be better employed that way. They will be more productively employed.

Reynolds *Is this a trend that you see in Zambia at the moment?*

Muliokela It's a trend I see in every country which wants to make agriculture a centrepiece of economic development, Zambia included.

Reynolds *Is that outside Sub-Saharan Africa as well?*

Muliokela UK America, basically everybody there was a subsistence farmer. And now in the US there are about 3 million farmers that have 270 million people. But if you look at the jobs one in every three jobs is from agricultural related activity. That's what we are going to do over there.

Reynolds *Now your research - you have a number of different client groups. Just explain what those are?*

Muliokela Our clients in Zambia - Zambia has six hundred and three thousand farmers. We reach all of them through the information we produce. We reach them through extension, we reach them through the radio, we reach them through publications and so forth. But we want to concentrate basically on the two hundred thousand, the most viable ones, and who think that they would benefit by having additional technology to make them a little bit more proficient in their production.

Reynolds *But I see that among your list of research activities conservation tillage is one of the key areas that you're doing. Now to my mind and I'm sure many other listeners, conservation tillage smacks of subsistence farming, very low input, not really the commercial farmer that you say has potential for increasing agricultural production?*

Muliokela One of the inputs of one of the characters of conservation farming is that you want to make the land more sustainable. So it doesn't matter whether you are a commercial farmer or a small farmer you must adopt practices which would allow you to ensure that your land remains sustainable every year. And then secondly we believe in this country and many developing countries the issue of input costs is a very big issue. So conservation tillage among other activities seeks to promote cost effective technologies without compromising yields.

Reynolds *Is there a role for bio-technology in low cost efficient agricultural production that's applicable here in Zambia?*

Muliokela In fact that's where it comes in. The challenges of agricultural production in developing countries including Zambia is that we are inefficient producers. Inefficient from different ways. Some of the varieties are low yielding. Some of them are outdated. Some of them don't respond to technology. So biotech, when they package up all these good varieties or packages in such a way that they make farming efficient, has a very big role. There is no substitute for it, we need to have it.

Reynolds *So you're thinking in terms of disease, virus free, planting material? what sort of biotech are you thinking of?*

Muliokela There are several technologies for example there's a controversy now on genetically modified maize. If you look at what has been genetically modified in some cases they modify the crop to be tolerant to weedicides which makes weed application much more efficient and timely. Sometimes they genetically modify a particular crop to be tolerant or resistant to stock borer. And then of course you are talking about rapid multiplication systems for crops like cassava, for bananas, for Irish potatoes, for sweet potatoes. So the scope is vast.

Reynolds *But you wouldn't turn your back on GM crops?*

Muliokela No.

Reynolds *Do you have any here?*

Muliokela I think Zambia has a stand but we don't have any here. But as a scientist, I've no quarrel with genetically modified, you know, good crops. The key things

are really the GMO debate must go back to the concept of biosafety which says if you have to give me a GM in a crop I must have a prior consent, that's number one. You must tell me what is that GMO, what is the constitution. And then secondly I must have a competent authority to handle these. That's the problem here, Zambia has no competent authority. And it's not only Zambia but I think there are many countries within the region. And so the safest route is to say we don't need it. But to me the best route would have been to say let us establish a competent authority to deal with biotech outputs and see how to best handle them.

Reynolds *Ten years time, if agriculture here in Zambia goes in the direction you would like to see it give me a breakdown of what those six hundred thousand farming families are going to be doing?*

Muliokela What is going to happen is that the two hundred thousand farmers who are more or less hobby farmers or destitute farmers will be disappeared. They will have a much more smaller farming population but very efficient, biotech inclined They will not shy away from new technologies, they will go out and espouse it. And I've yet to see a country with so much tremendous potential like Zambia. I've travelled 70 countries, I've yet to see one with a tremendous potential like Zambia. Zambia really is just heaven on earth, we simply need to unlock its energies. *End of tape*.

CTA

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Agrobiotechnology and food security

GM food crops – no evidence that they bring benefits

Cue: Miriam Mayet is an environmental lawyer from South Africa working with NGOs on environmental issues. She is very concerned about modern biotechnology, specifically genetic engineering and GM feed crops. She tells Songolo Akakandelwa, why.

IN: "It fundamentally interferes …"
OUT: "….your own country and the region."
DUR'N 4'18"

BACK ANNOUNCEMENT:
Miriam Mayet was talking to Songolo Akakandelwa.

Transcript

Mayet It fundamentally interferes with the way nature reproduces. It is very very different from traditional and conventional biotechnologies. It is a technology owned by multinational corporations. There hasn't been enough time for adequate safety testing. It has never been tested in humans. It fundamentally impacts on food production systems. It will have far ranging implications on household food security.

Aka *Talking about implications, how are these going to impact on these people?*

Mayet The first thing is that it is not a sustainable technology. If you look at Bt cotton for example in South Africa we see that there is pest resistance. Farmers have to spray against the very insects that Bt is supposed to protect the plant against- namely bollworms. And they have two choices. Either they spray their crops or they face wholesale crop failures just to give you one example. When you look at Roundup Ready crops, there's injudicious use of chemicals. There's dependence on the same company who supplies the seed – you have to buy the herbicide that goes with the seed and it has negative environmental implications and the most important thing is that you have weed resistance. So it is not a sustainable technology. It is not an appropriate technology.

Aka *Let's take for instance, the small scale farmers are not scientists in their own right. What is your reaction to such situations?*

Mayet I just think farmers are caught in the middle. They don't have political interests. They have food security and economic interests. They have interests to survive. And they want assistance from governments, from the private sector, from NGOs to enable them to increase household food security. And the tragedy here is that quite apart from consumers being at risk, in terms of the negative impacts on human health, farmers will be the losers.

Aka *And how has been your experience in S. Africa?*

Mayet There has been very rapid introduction of this technology. We have 350,000 ha planted with GM crops. 179 applications have been granted for field trials. We have no comprehensive balanced policy over the introduction of modern biotechnology into our food production systems. We have a biotechnology strategy that is biased in favour of the biotechnology industry and we have very bad legislation and no labelling of GM food, no segregation of GM crops from non-GM crops. there's a lot of contamination – co-mingling. And we have very little public participation.

Aka *So in this case, what fears would you see if there is rapid engagement into such type of technology?*

Mayet I think that we are going to see a lot of farmers being impoverished in future, long term. Because if you look at the Makatini Flats there's been a situation where dependency has been created. The farmers are completely and utterly dependent on Monsanto to help them obtain credit, to help them purchase the seed, to help them access the market and it's not a sustainable way of uplifting farmers.

Aka *What lessons do you give to the other member states in the region to ensure such problems are not faced in the other countries?*

Mayet The first thing is don't follow South Africa's example. They have done very bad laws. Do first, a good policy. The policy should underpin your legislation. You can't have legislation in isolation or in a vacuum. South Africa did it the other way round. They did the law first and only now the policy is coming. So first do a good comprehensive fair policy taking into account the long term interests of your own country and the region. *End of track*